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# NASA TECH BRIEF



## A Report of Advancements in Structural Dynamic Technology Resulting from Saturn V Programs

A two-volume report presents a comprehensive discussion of the practical aspects of the structural dynamic analysis in the Saturn V program. Volume I, a summary of the material presented in Volume II, is oriented toward the program managers of future structural dynamic programs. Volume II, oriented toward the technical leaders of such programs, contains a comprehensive discussion of the methods and procedures used in the Saturn V program, as well as an analysis of the major problems encountered and their solutions.

During the Saturn V program, significant advancements were made in the practical application of theoretical methods in the areas of scale modeling, math modeling, and dynamic testing. Practical guidelines were established for larger order matrix analyses of structural dynamic systems, including verification by both scale modeling and structural tests. The Saturn V program was a pioneer in the extensive use of large order structural dynamic mathematical models.

Guidelines prepared identify common difficulties in analysis, scale modeling, dynamic testing, and data reduction, and establish successful procedures for avoiding these difficulties. In addition, cost and accuracy data pertaining to scale model and math model technology were compiled.

The information presented in the report may find specific application in: the automobile industry, for analysis and test of automibile flexible body dynamics; the construction industry, for bridge analysis and dynamic tests of water towers and other liquid filled tanks; the building industry, for analysis and test of building response to earthquakes and other dynamic disturbances; electrical systems analysis, for analysis of electrical system dynamics using finite element models; and the shipbuilding and transportation industry, for analysis of response to shock and other transportation loads induced in delicate cargoes.

### Note:

The following documentation may be obtained from:

National Technical Information Service
Springfield, Virginia 22151
Single document price $3.00
(or microfiche $0.65)

Reference:
NASA-CR-1539 and CR-1540, Advancements in Structural Dynamic Technology Resulting From Saturn V Programs (Volumes I and II).

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